#258 - Posters

Preoperative Disc Height As A Predictor Of Postoperative Outcomes In Laminoplasty For Cervical Spondylotic Myelopathy With Degenerative Spondylolisthesis

Orthopaedics / Spine / Degenerative Spine Surgery

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Background
Although laminoplasty (LP) is a common surgical treatment for cervical spondylotic myelopathy (CSM) with degenerative spondylolisthesis, its postoperative outcomes remain controversial.

Objectives
This study aims to identify factors affecting postoperative outcomes in patients undergoing LP for CSM with degenerative spondylolisthesis.

Study Design & Methods
We retrospectively analyzed 136 patients who underwent LP for CSM between 2005 and 2020. Of these, 29 cases (20 males, 9 females) with degenerative spondylolisthesis at the responsible level were included. The responsible level was defined as showing intramedullary signal changes or loss of spinal fluid at the level of spondylolisthesis, based on prior reports. The average patient age was 71.7 years (range: 50–87), with an average follow-up period of 5.5 years (range: 2–12). Patients were divided into two groups: those who achieved the Minimum Clinically Important Difference (MCID) in the Japanese Orthopaedic Association (JOA) improvement rate (good improvement group), and those who did not (poor improvement group). Pre- and postoperative C2-7 alignment, C2-7 range of motion, slip distance at the responsible level, and disc height at the responsible level were compared between the two groups.

Results
The average JOA improvement rate was 50.2%, with 66% of patients achieving MCID (19 in the good improvement group, 10 in the poor improvement group). No significant differences were observed between the two groups in pre- and postoperative C2-7 alignment, C2-7 range of motion, or slip distance at the responsible level. However, the disc height at the responsible level was significantly greater in the good improvement group (6.1 mm) compared to the poor improvement group (4.8 mm) ($p=0.02$).

Conclusions
Patients in the good improvement group had significantly greater preoperative disc height. Previous studies have shown the disc bulging during cervical extension on kinematic MRI. In cases with high disc height, increased intervertebral range of motion may lead to more significant anterior compression by disc bulging. Following LP, the spinal cord shifts posteriorly, and the reduced cervical spine motion may decrease this anterior compression, enhancing the decompression effect. Thus, preoperative disc height may be a useful predictor of the therapeutic efficacy of LP in patients with CSM and degenerative spondylolisthesis.